(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
23 December 2004 (23.12.2004)

PCT

(10) International Publication Number
## WO 2004/111934 A3

(51) International Patent Classification⁷: G06T 5/00, 7/00

(21) International Application Number:
PCT/CA2004/000891

(22) International Filing Date:  16 June 2004 (16.06.2004)

(25) Filing Language:  English

(26) Publication Language:  English

(30) Priority Data:
60/478,766  16 June 2003 (16.06.2003)  US

(71) Applicant (for all designated States except US): DY-NAPIX INTELLIGENCE IMAGING INC. [CA/CA]; 3575 St-Laurent Blvd., Suite 199, Montréal, Québec H2X 2T7 (CA).

(72) Inventors; and
(75) Inventors/Applicants (for US only): BOUDREAU, Alexandre, J. [CA/CA]; 4763 Victoria, Montréal,

Québec H3W 2M9 (CA). DUBE, Patrick [CA/CA]; 403, St-Joseph Ouest, Apt. 18, Outremont, Québec H2V 2P3 (CA). KAUFFMANN, Claude [CA/CA]; 4100 Avenue Laval, Montréal, Québec H2W 2J3 (CA). EL ABIDINE, Khaldoune, Zine [CA/CA]; 1735, rue Deguire, Apr. 9, St-Laurent, Québec H4L 1M8 (CA).

(74) Agents: MANOLAKIS, Emmanuel et al.; Gowling Lafleur Henderson LLP, 1 Place Ville Marie, 37th Floor, Montréal, Québec H3B 3P4 (CA).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

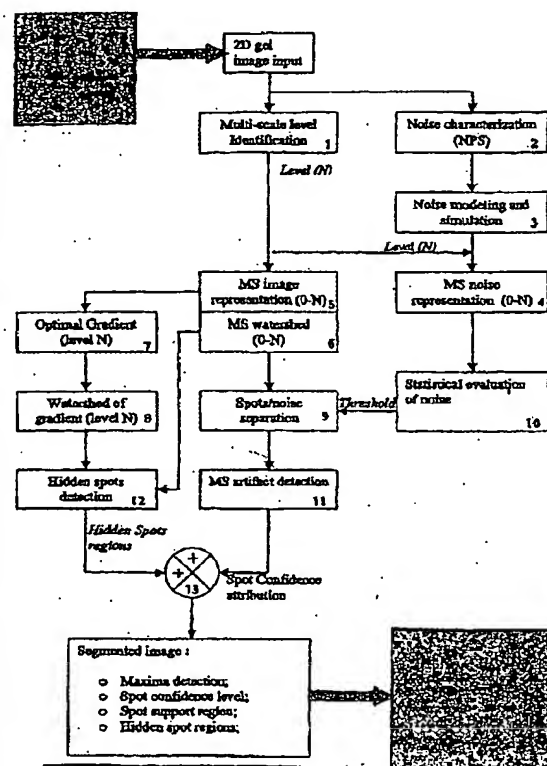(54) Title: SEGMENTATION AND DATA MINING FOR GEL ELECTROPHORESIS IMAGES



Figure 1: overall image analysis method

(57) Abstract: A segmentation method is provided for the automated segmentation of spot-light structures into D images allowing precise quantification and classification of said structures and said images, based on a plurality of criteria, and further allowing the automated identification of multi-spot based patterns present in one or a plurality of images. In a preferred embodiment, the invention is used for the analysis of 2D gel electrophoresis images, with objective of quantifying protein expressions and for allowing sophisticated multi-protein pattern based image data mining, as well as image matching, registration, and automated classification.

WO 2004/111934 A3

**WO 2004/111934 A3**

(84) **Designated States** *(unless otherwise indicated, for every kind of regional protection available):* ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Published:**
— *with international search report*

(88) **Date of publication of the international search report:**
9 June 2005

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
23 December 2004 (23.12.2004)

PCT

(10) International Publication Number
# WO 2004/111934 A2

(51) International Patent Classification⁷: G06T 5/00, 7/00

(21) International Application Number:
PCT/CA2004/000891

(22) International Filing Date: 16 June 2004 (16.06.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/478,766   16 June 2003 (16.06.2003)   US

(71) Applicant (for all designated States except US): DY-NAPIX INTELLIGENCE IMAGING INC. [CA/CA]; 3575 St-Laurent Blvd., Suite 199, Montréal, Québec H2X 2T7 (CA).

(72) Inventors; and
(75) Inventors/Applicants (for US only): BOUDREAU,

Alexandre, J. [CA/CA]; 4763 Victoria, Montréal, Québec H3W 2M9 (CA). DUBE, Patrick [CA/CA]; 403, St-Joseph Ouest, Apt. 18, Outremont, Québec H2V 2P3 (CA). KAUFFMANN, Claude [CA/CA]; 4100 Avenue Laval, Montréal, Québec H2W 2J3 (CA). EL ABIDINE, Khaldoune, Zine [CA/CA]; 1735, rue Deguire, Apr. 9, St-Laurent, Québec H4L 1M8 (CA).

(74) Agents: MANOLAKIS, Emmanuel et al.; Gowling Lafleur Henderson LLP, 1 Place Ville Marie, 37th Floor, Montréal, Québec H3B 3P4 (CA).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,

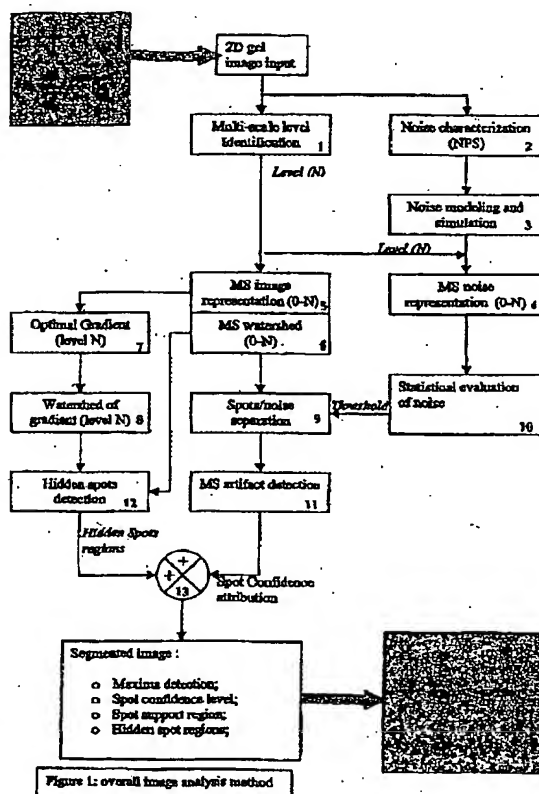(54) Title: A SYSTEM FOR ANALYZING AND MANAGING IMAGE INFORMATION

(57) Abstract: A segmentation method is provided for the automated segmentation of spot-light structures into D images allowing precise quantification and classification of said structures and said images, based on a plurality of criteria, and further allowing the automated identification of multi-spot based patterns present in one or a plurality of images. In a preferred embodiment, the invention is used for the analysis of 2D gel electrophoresis images, with objective of quantifying protein expressions and for allowing sophisticated multi-protein pattern based image data mining, as well as image matching, registration, and automated classification.

Figure 1: overall image analysis method

WO 2004/111934 A2

BEST AVAILABLE COPY

## WO 2004/111934 A2

TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) **Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI,

SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Published:**
— *without international search report and to be republished upon receipt of that report*

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*